

$$\int \frac{x+1}{x(1+x^2)} dx =$$

INT-S1-007

$$= \int \frac{C}{x} + \frac{Ax+B}{1+x^2} dx$$

A? B? C?

$$\frac{C(1+x^2) + x(Ax+B)}{x(1+x^2)} = \frac{C + Cx^2 + Ax^2 + Bx}{x(1+x^2)} =$$

$$= \frac{x^2(C+A) + Bx + C}{x(1+x^2)}$$

$$\begin{cases} C+A=0 \\ B=1 \\ C=1 \end{cases} \quad \begin{cases} A=-1 \\ B=1 \\ C=1 \end{cases}$$

$$= \int \frac{1}{x} + \frac{-x+1}{1+x^2} dx$$

$$= \ln|x| - \int \frac{x}{1+x^2} dx + \int \frac{1}{1+x^2} dx =$$

$$= \ln|x| - \frac{1}{2} \int \frac{2x}{1+x^2} dx + \int \frac{1}{1+x^2} dx =$$

TIPO $\int \frac{f'(x)}{f(x)} dx = \ln|f(x)| + k$

$$= \ln|x| - \frac{1}{2} \ln(1+x^2) + \operatorname{arctg} x + k$$